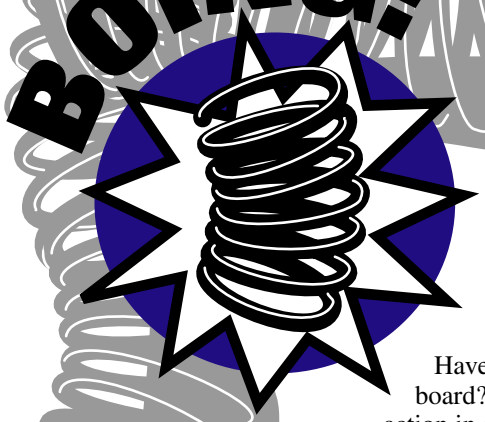


Springboarding

Have you ever bounced on a diving board? Have you noticed the springy action in a hair barrette?

These are examples of springs that are not coiled--springs which absorb and store energy, but are not in the shape of a coil. Leaf springs, which are usually flat, and torsion springs, are both types of springs which work because of the elasticity of the material they're made from.

Other types of springs pop up...

- in a truck, where leaf springs are used to cushion the ride
- in a computer disc where the torsion spring helps to slide the protective covering when the disc is loaded
- in a clipboard where the torsion spring works to clamp down your paper

Where else can you find springs that are not coiled?

In today's activity, you'll test the springiness of uncoiled springs made from paperclips to see how far they can make a cottonball fly.

What you'll need:

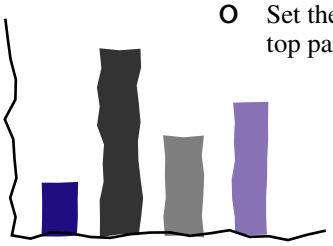
2 small paperclips

2 large paperclips

tape

a cottonball
(or a small wad of paper)

paper



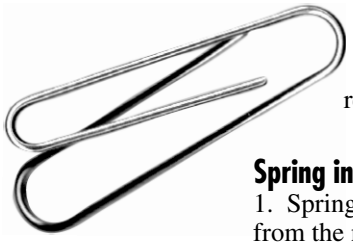
Try it!

- Without much effort, paperclips can be formed into mini-launchers or catapults. Today, you'll create a number of different paperclip launchers to try to determine which type of launcher is most effective.
- To make this type of non-coiled spring launcher, pull up on the inside loop of the paperclip, so that the clip forms a "v" shape. Do this with two large and two small paperclips.
- Set the paperclip "v" on the table so that one loop is up in the air, and one loop is flat on the table. Holding the flat side to the table, push down on the top side, and watch it spring back into place. It even makes a noise!
- Using the two large paperclips, set up two different launchers. Tape one to the table or to some cardboard, so that the larger loop is flat on the table and the smaller loop (which will launch your cottonball) points upward. Do the opposite with the other large paperclip: tape the smaller loop to the table, leaving the larger loop in the air.
- Tape down the smaller paperclips using the same technique.
- Now that your launchers are ready, you'll need a basket to hold the cottonball. Use a small piece of paper to form a platform in the shape of an "L". Tape this to the top of the springy part of your launcher.
- Set the cottonball in the basket, pull down on the top part of the paperclip, and watch that cottonball fly! How far did it go? Will it go that far if you launch it again?
- Experiment with the different launchers to find out which one launches the cottonball the farthest or the highest. Which catapult seems to work the best? Why do you think that might be?

IBM

Children's Discovery Museum

- As engineers design different tools and machines, they conduct many tests to determine which materials to use and which shape of spring will work best for the job to be performed. Try making a graph the way that engineers do to show the results of your launching tests. If you were going to recommend one paperclip launcher for a distance contest, which one would you recommend? Why?



Spring into *The San Jose Mercury News*

1. Springboard to the future! Choose a photograph from the newspaper. What do you think happened just before that picture was taken? What happened after the picture was taken? Write a story about what happened the day after that picture was taken. Draw a picture to accompany your story.

2. Did you know that computer keyboards have tiny springs under each individual key? In Silicon Valley, many news stories cover changes in the computer industry. Can you find any articles in today's paper about computers? What do they tell you about the high-tech industry?

Find out more....

Check out these books and Internet sites:
An Early Start to Energy by Roy Richards. Simon and Schuster, 1992.
www.heli-cal.com/html/Literature/NRelease/nr071597.htm features design challenges and solutions involving springs.